# Conservation of the Biological and Cultural Diversity of the Colombian Amazon Piedmont: Dr. Schultes' Legacy.

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## Abstract

Richard Evans Schultes, the father of modern ethnobotany, arrived in Colombia in 1941. Over a period of 50 years, Schultes carried out the most extensive research of his era on the plants and cultures of the Colombian part of the Northwest Amazon. His invaluable work stands out not only for its scientific excellence, but because he was the first researcher to emphasize the important role to be played by ethnobiology in the coming years. Even in Schultes' time, ethnobotanists across the world were pressed to recognize the importance of focusing on both the conservation of the Amazon jungle and of its inhabitant cultures, societies which serve as repositories of knowledge about many medicinal substances with great potential application for the Western world. Schultes took direct action, strongly urging the research community to cease expeditions having the sole purpose of searching for new medicines; instead, he insisted on the need to train professionals willing to share life with the peoples of the tropical jungles. Dr. Schultes worked to transform a botany increasingly concerned with economic potentials into an ethnobotany with heart. The Amazon piedmont is the world's region of greatest biodiversity, as well as home to one of the last surviving ancient shamanic traditions, the **yagé** culture, which comprises five distinct ethnic groups. The **yagé** culture preserves a comprehensive set of shamanic practices, including the ritual use of their sacred plant, **yagé** or **ayahuasca** (*Banisteriopsis* sp.), alongside a vast knowledge of the jungle and its medicinal plants. With the enthusiastic support of ethnobotanist Mark Plotkin, one of Schultes' dearest disciples and President of The Amazon Conservation Team, we have implemented a program that seeks the protection, recuperation and strengthening of the indigenous cultures of the Amazon piedmont. We believe that their knowledge and practices, as well as their shamanic systems, are extremely important and useful for biodiversity conservation and for expanding the scope of health models around the world. The diverse programs of the Amazon Conservation Team have a common objective: to engender a true intercultural dialogue between traditional indigenous knowledge and Western science. Thus, our program in Colombia has developed an integrated strategy for biodiversity and cultural conservation that includes shamans and apprentices programs, construction of ceremonial houses, planting of medicinal gardens, sacred lands reclamation, ethno-education and sustainable production projects, in each case in concordance with the shamans' guidance. The culmination of our recent work was the historic gathering of forty indigenous healers from 7 tribes across the Colombian Amazon, surviving practitioners of one of the last great shamanic traditions. The participating elders produced the first code of ethics of traditional medicine of the Colombian Amazon, which was published with the title "The Beliefs of the Elders."

## Introduction

Dr. Richard Evans Schultes, ethnobotanist of Harvard University, arrived in Colombia in 1941 with the charge of finding new seeds of the rubber tree (*Hevea* spp.) be-

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cause of the imminent commercial blockade that Japan promised to establish in Southeast Asia following the attack on Pearl Harbor. Together with botanists from the Instituto de Ciencias Naturales, he began his visits to the Northeast Amazon region, discovering in his travels various indigenous groups barely known to the Colombian government. When he finished his seed collection activities (and when WWII was over) Dr. Schultes wished to resume his expeditions in the Amazon; this work continued for the following 50 years of his life (Schultes 1988).

It is redundant to say that his monumental body of work, collected in 10 books and more than 450 scientific papers, including the discovery and classification of hundreds of new plants to science, is today the most complete scientific study of the Colombian Amazon, its plants, and its indigenous cultures, with a special emphasis on plants of potential medical use. Among many awards, in 1992 he received the Gold Medal from the Linnean Society of London, generally considered the "Nobel Prize" of Botany. In Colombia, he was decorated with the Cruz de Boyacá by then President Belisario Betancur, as a deserved homage to his life and work in the country.

Until then, the search for plants was conducted in the framework of economic botany, with the purpose of obtaining natural resources for human use: plants as sources of food, medicines, fibers, textiles, aromas, and flavors, and as raw materials for technological and industrial processes. History recalls the gifts that the American continent gave to the world: rubber, quinine, ipecac, coca, corn, tobacco, potatoes, and tomatoes, all of which transformed human culture and reached cosmopolitan distribution.

Yet, Dr. Schultes was among the first to call attention to the huge knowledge that indigenous tribes had of the forest and of medicinal plants. From his early works, he pointed out the importance of establishing a close relationship with the shamans to access that knowledge. He began to participate in ritual ceremonies, and, in his last years, proposed that ethnobotany should not be limited to sending scientists to find new plants, and that instead, it should commit to the conservation of the forest and of its genuine inhabitants (Schultes & Raffauf 1992).

Ultimately, the search for useful plants took a new course because of the advent of biotechnology and the development of mechanisms for the discovery of active principles in genetic resources. By the same token, the subject of medicinal plants has gained unexpected popularity in the last years, and there is growing number of scientific disciplines that work toward the investigation, study, and application of these plants in modern medicine. Biotechnology signals a new stage in the pharmacology of plant origin. But Dr. Schultes' practical vision of the development of ethnopharmacology still is very much with us.

## Medicinal Plants in the Modern World

Today we find that more than 70% of the world's population uses plants to solve basic medical problems. The pharmaceutical industry obtained from the plant kingdom the raw materials needed for the elaboration of almost 30% of the pharmaceutical products used today in modern medicine. This trend continues with the search for useful plants in the tropical rainforests of the planet, as the industry is starting to exhaust the possibilities of new drugs derived from chemical and genetic engineering, or from the synthesis of chemical compounds derived from petroleum or coal tar (Plotkin 2000).

In recent years, phytochemical research has developed new technologies for the identification of active principles, such as NMR and the development of chemotaxonomy, among others. Similarly, pharmacology now better understands the efficacy of medicinal plants with the discovery of antioxidant compounds and of substances for the "clean up" of free radicals, oligoelements, and other principles for which we can only now ascertain their activity.

Modern medicine, even given the enormous scientific progress, recognizes its limitations in the cure of many of the health problems that still plague humanity. This is also perceived by the general population, moved in part by the inherently high costs of western healthcare and also by the need to search for new solutions to old health problems. Given this situation, the WHO is promoting research into and careful, sensible use of medicinal plants.

Despite the discipline's rising acceptance, there is not still a conceptual and technical framework to unify criteria for the use of medicinal plants. While pharmaceutical companies insist on looking for plant resources for the isolation of active principles, there is the growing popularity of "natural" products in the market, that is, pharmaceutical preparations of plant origin that contain all the plant or parts of it, but not the active principle exclusively. On the other hand, different approaches see in plants alternative paths of therapeutic use, such as homeopathic dilutions or the use of floral essences in a therapeutic setting.

By the same token, we find that there is no uniformity in the language used to talk about the properties and the effects of medicinal plants. On one hand, modern medicine insists on explaining the functioning of herbs from the standpoint of pharmacology, and searches for plants that are antibiotic, anti-inflammatory, and anti-hypertensive. On the other hand, the natural medicine of European origin continues to employ concepts that have no parallels in modern biomedical language, such as carminative, resolving, emollient, or astringent plants. Finally, both traditional and popular medicines emphasize the gathering of knowledge about plants from the standpoint of cold and warm plants, and of depurative, purgative, and tonic plants.

These conceptual approaches employed in the study of plants, of which some are negative and some positive, address two issues that are even more important: 1) the relationship between medicinal plants and ecology, and 2) the origin of knowledge and the role of indigenous, black, and campesino medical traditions.

We now recognize that the tropical rainforests of the planet form veritable medicinal plant germplasm banks that hold enormous potential for modern medicine. Nevertheless, we realize that these ecosystems are threatened, and that the number of plants in danger of extinction increases every day. Immediate, specific actions are required in order to conserve medicinal plants, among which are the creation of germplasm banks *in situ* and *ex situ*, the construction of botanic gardens, the control of the exploitation of and commerce in plants, and the establishment of vast protected areas recognized for their high diversity in medicinal plant species.

Since 1988, and based on the Declaration of Chiang Mai, the WHO, the IUCN, and the WWF promote actions toward the conservation of medicinal plants, in keeping with the affirmation "save plants to save lives" (Akerele *et al.* 1991). The problem, nonetheless, is not only the plant resource and its potential extinction; at the root lies a conflict that is even more complicated. The knowledge of medicinal plants is still the patrimony of indigenous and campesino communities and of ethnic minorities all over the world. They are the direct inheritors of a very old therapeutic tradition, and they conserve the knowledge of the use of medicinal plants.

But precisely these peoples are the ones now threatened with extinction because of the loss of their territories and their culture, and the slow but sure impoverishment to which they are subjected. Not only the forests die; their masters and true inhabitants die too. With them also dies a part of our heritage, of our memory, of the diversity that until now has been the wealth that made life on this planet possible. With them also passes a vital way to relate to the environment, with Mother Earth, and with the spiritual world. With them die knowledge systems that, however different from ours, are no less effective. With them dies, regarding the topic that interests us today, the source of medicinal plant knowledge.

## Recovery and Promotion of Medicinal Plants

In view of this, perhaps many are interested only in the study of medicinal plants in the context of modern medicine, and in the phytochemical and pharmacological investigations to this end. That is all good, and hopefully we can continue to find new effective medicines for terrible problems such as cancer and AIDS.

Others may insist on the manufacturing of natural products for the enormous natural product market that has greatly expanded in big cities the world over. With these products, costs can be reduced, local agricultural industries can be created that can compete with the large pharmaceutical laboratories, and remedies may be found that can replace chemical substances isolated for the treatment of minor ailments.

There is a more urgent task: the recovery and promotion of medicinal plants in the communities. The primary considerations are the conservation of medicinal plants as an important component of biodiversity, and their use as therapeutic resources in self-care and primary healthcare programs. Medicinal plants can thus be viewed as dual-use implements for health and ecology. Moreover, they embody like no other path to wellness an intrinsic relationship between health and nature.

Apart from anthropological, ethnobotanical, ecological, phytochemical, pharmacological, commercial, and medical investigations, all of which are needed for the consolidation of medical botany as a modern scientific discipline that includes the publication of documents, the convening of seminars and symposia, the creation of academic programs and the design of policies and legislation, we urgently need to initiate a concrete plan for the recovery and promotion of medicinal plants without delay.

It is essential, from the outset, to recover the medicinal plant resource: germplasm banks, botanic gardens, household medicinal gardens, and nurseries for species propagation. At the same time, we need to assist in the process of the recovery of memory and tradition, a task that requires a respectful and serious approach to the roots of the knowledge of indigenous, black, and campesino peoples through projects that promote the strengthening of traditional medicine; a dialog of knowledge systems with medicine men, midwives and indigenous massage therapists; and a review of memories with the grandparents and elders with the goal of the transmission of knowledge to the new generations. Nevertheless, none of this will be practical if we do not achieve the recovery of medicinal plant use from the standpoint of a prudent introduction of the plants in formal and informal health services, especially at the levels of self-care and primary health care. All efforts depend, finally, on the recovery of trust in medicinal plants that was lost in the wake of the advance of science, technology, and consumerism (Zuluaga 1994).

## Indigenous Cultures, Conservation, and Biodiversity

With the advent of the scientific and industrial revolutions, the history of man on Earth changed dramatically. Profound social, economic, and cultural transformations brought history to what we now refer to as "modern times,"

characterized in the last 100 years by great demographic growth; a trend towards urbanization; the use of energy derived from fossil fuels; the generation of nuclear weapons; the development of artificial intelligence, computers, and informatics; the accumulation of consumer goods as indicators of human well-being; and a radical cultural change that threatens to homogenize the peoples of Earth, all leading to the summation of the planet as a "small village."

Despite the significant progress, at the same time we feel a great uneasiness: we did not leave behind war as a strategy for coexistence, and violence is surfacing among all peoples. We perceive economic inequality among human beings and societies, expressed as gross disparities between First and Third World countries, that requires the pursuit of social justice at all costs. We are very concerned about the present-day criteria for development, one component of an irrational exploitation of natural resources as the first and foremost supply for the wheels of production, about consumer levels that are ecologically unsustainable, and about a general deterioration of the biosphere due to an excess of waste and environmental contamination.

The increasing awareness of the latter dilemma, the great "environmental problem," has generated an urgent search for solutions. The search was initiated in a romantic fashion by the ecologist movements of the '70s and gradually evolved into the principle of "ecodevelopment", followed more recently by the concept of sustainable development, which is development that satisfies the needs of the present generation without compromising the capacity of future generations to satisfy their own needs, a model that still has currency despite the many conceptual distinctions and diverse interests that surround it.

The guidelines of sustainable development run mainly along four paths: 1) the conservation and/or recovery of ecosystems and of the diversity of fauna and flora in various regions of the world, 2) the application of economic models conducive to a slowdown of economic growth, 3) the creation of new soft, clean, or less contaminating technologies, and 4) the control of demographic growth. Thus, in ecological terms there are four options: conservationist, economics-oriented, technologist, and population-oriented.

While there is a movement to integrate the four strategies, their actions take place largely in an independent and exclusionist fashion. There are several underlying ethical problems relating to sustainable development: first, the apparent antagonism between economy and ecology; second, the conflict between pure conservationism and the consideration of the human communities that live in the ecosystems where intervention is deemed necessary; and lastly, the challenge to the perpetuation of the present development model by the desire for dramatic cultural change.

In the midst of all of these difficulties, a common thread appears in the sustainable development rhetoric: the concept of biodiversity as the cornerstone for development of life on the planet. The loss of diversity implies the loss of possibilities for survival; therefore, the conservation of diversity becomes the fundamental strategy of sustainable development. This school of thought realized a shining moment at the Convention on Biodiversity in Rio de Janeiro, and in the International Biodiversity Convention signed by most of the world's nations.

Nevertheless, diversity preceded by the prefix "bio" has been ordinarily used in the context of diversity of ecosystems, diversity of flora, and diversity of fauna. This conception reinforces the trend toward pure conservationism and does not take into consideration the problems of human populations.

Biodiversity, for geographic and climatic reasons, is mostly concentrated in tropical areas, where the great rainforests and the regions with the highest life diversity can be found: the equatorial African rainforest, the rainforests of Southeast Asia and the Polynesia, and the tropical rainforests of Central and South America. These regions became, for most ecological organizations, the areas with the highest conservation intervention.

Paradoxically, the tropical areas of the planet are the regions where the poorest countries and the populations with the least survival means from the point of view of the market economy are found. More specifically, it is in the equatorial rainforests where most of the minority ethnic groups survive, peoples known as "aboriginal groups," "indigenous populations," or "autochthonous populations."

It is those societies, because of their relative isolation from the development of occidental history, that conserve linguistic and cultural knowledge as well as production traditions different from those of modern man, and that recently have been perceived as a rich source for the survival of human culture. We speak now about not only biological diversity, but also cultural diversity. It is vital to understand that the survival of indigenous people brings with it a myriad of benefits to all. It is an issue that goes beyond simple economics and addresses fundamental aspects of human evolution and adaptation: "Cultural diversity is as important as biological diversity: both are guarantees of the richness of life".(Barón *et al*. 1995).

As a result of our western cultural crisis, a new planetary consciousness has emerged in the last few years which attempts to reassert the value of indigenous people in terms of their strategic management and conservation of ecosystems; in terms of their traditional health practices; in terms of their more natural and integrated vision and lifestyle; and in terms of their cognitive systems for the utilization of biological resources.

Indigenous people present a variety of wealth that until recently has not been valued. We may not now coldly consider only a labor force, gold, land and their medicinal plants: they provide an intangible wealth which may nevertheless be quantified in economic potentials such as bioprospecting, raw materials for new medicines, alternative ecosystem conservation models and appropriate technologies. From this perspective, support for development project with indigenous communities not only brings benefits in alleviating their dramatic poverty; it can also bring benefits to all mankind.

The problem however, has not been resolved. In the politics of conservation, there is still conflict between those who desire an emphasis on biological diversity and those who argue for cultural conservation. There are only a few examples of experiences that integrate the two.

The interests of conservationists, the respect for indigenous cultures, and the increase in bioprospecting activities, more than any other circumstance, is forcing us to reexamine and reflect on the relationship between biological and cultural diversity.

## Shamanism: Biological and Cultural Diversity

The concept of "indigenous peoples" has been generally defined pursuant to the International Labor Organization's (ILO) Convention 169, which ascribes to them a range of distinct attributes such as: status as an ethnic minority, vernacular language, traditional production systems, ethnic-territorial origin, or voluntarily declaring themselves as Indians.

The word shaman has become fashionable. In its original meaning it referred to the way the Tungus, the inhabitants of a village in Siberia, named those residents who were in charge of health and the relationship with the supernatural world. Today the word shaman has been established by anthropologists to extend to all healers, traditional doctors and priests of autochthonous, aboriginal, primitive or indigenous people the world over. Although the common denominator of most shamans appears to be the art of healing, in a strict sense shamanism is not all about medicine. Therefore, the boundaries between shamans, healers, traditional doctors, and medicine men is unclear.

Strange ceremonies and rituals, dances and chants, colorful attire, smoke and incense are all part of the picture in the world of shamanism. A profound sense of the sacred, powerful wisdom with respect to nature, the use of certain techniques to induce a trance, the belief in the existence of other worlds, the consumption of plants considered sacred which are ill-referred to as hallucinogens, and an extraordinary knowledge of plants and their properties are all facets of the shaman's vocation.

To western societies, the universe of the shaman still appears strange and mysterious. A combination of incredulity and admiration, and of persecution and benevolence, as well as struggles with contradictory concepts and unfamiliar paradigms are but some of the manifestations of modern man's ambivalence when confronted with shamans and their spiritual worldview.

The loss of biological diversity, the extinction of plants and animals and key ecosystems, is the conspicuous characteristic of our planetary crisis at the start of new millennium. We are also losing cultural diversity, specifically the probable extinction of hundreds of cultures and their traditions. With their passing, we risk the extinction of shamanism, one of the last remnants of a singular path to acquiring knowledge that may hold the key to new adaptive strategies for a world that appears to have lost the way to reestablishing health and respect for nature.

Experience has taught us that shamanism provides the structural support for indigenous cultures and their productive systems; in those societies where the shaman disappears or loses authority and the tribe's medical traditions fall from practice, extinction and/or acculturation become imminent, with severe consequences for the members. Therefore, social, cultural, economic and political development in indigenous societies must emphasize support for the shamanic institution and its traditional medicine practice.

Indigenous cultures are largely dependent on the survival of shamanism; therefore, the strengthening of the shamanic institution is indispensable to the preservation of biological and cultural diversity, and bioprospecting projects must incorporate this awareness in their work.

## The Concept of Health for Indigenous Communities

Along with ethnography and anthropology, a discipline that has contributed greatly to research on indigenous peoples is ethnobiology, and, in particular, ethnobotany. In the last 100 years there has been a steadily growing interest in learning more about the knowledge indigenous societies possess with respect to natural resource and especially the plants.

Indeed, ethnobotany highlights the huge store of medicinal plants, psychotropic and stimulants among others, and the practices of so-called traditional medicine and the shamanic systems. There is a strong relationship between ethnobotany, medicinal plants, traditional medicine and shamanism. Likewise, research on shamanism shows that the traditional medicinal knowledge resides largely with tribal elders and that their ritual practices do have a therapeutic effect.

Despite this awareness, we in the scientific community insist on researching and analyzing the efficacy of medicinal plants used by indigenous peoples using very restrictive pharmacological categories, usually with the exclusive goal of synthetically producing these medicines. We also insist on using the same modern medicine criteria to describe traditional medicine. But neither the medicinal plants nor traditional medicine coincide with bio-medical criteria. Furthermore, there is no correspondence between the indigenous concept of health and western rational thought. For indigenous medicine, health implies harmony or equilibrium with reality. A person is not merely a body – the essence of humanity also comprises emotions, thoughts, memories and spirituality. Indigenous peoples also stress harmony in social relations: family, neighborhood, and community. Their concept of health also implies harmony between man and nature and within nature, harmony with plant and animal spirits, and harmony with invisible people and sacred sites.

We may state in summary that the concept of health within traditional medicine always refers to the triad individual-society-nature, which transcends the definition of health in the context of modern medicine.

## The Concept of Biodiversity

For the western world the concept of biodiversity, derived from biology and ecology, carries with it an implicit moral and economic value. Our society places humans before nature, in contrast to the indigenous worldview in which there are no boundaries between the two. Biodiversity also implies economic exploitation, which has been taken to an extreme by placing a dollar value of all biological resources.

It is appropriate here to present the notion that nature has two distinct, not always opposite but frequently contradictory, values. To explain it better, I'll refer to medicinal plants (see Table 1):

> a) Extrinsic value of resources: refers to a market economy where medicinal plants are sought after and utilized to make a profit, referencing bioprospecting, intensive agriculture, natural products, essential oils, homeopathy, and floral essences among others. In all cases, it implies a technological transformation of the biological resource with the implication that human intervention is of added value.
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> b) Intrinsic value of resources: refers to life forms. Nature has an intrinsic value independent of mankind's technological intervention. These values represent direct benefits such as: biodiversity, landscape, health, culture and spirituality.

It is important to ask ourselves if, when we talk about biodiversity for the development of conservation strategies, about bioprospecting, and about programs with indigenous people, we are dealing with two different types of values. If so, we can assume that the western perspective speaks of extrinsic values whereas the indigenous perspective speaks of intrinsic ones.

**Table 1.** Value of the Resources.

| **Value of Nature** | |
|---|---|
| **Medicinal Plants** | |
| **Extrinsic Value** (Market Economy) | **Intrinsic Value** (Forms of Life) |
| Bioprospecting | Biodiversity |
| Intensive Cultivation | Landscape |
| Natural Products | Health |
| Essential Oils | Culture |
| | Spirituality |

## The Concept of Development

Both the orthodox focus of the modern economy, as well as the new proposals of the environmental discourse, refer to the concept of development. Be it progressive economic growth or sustainable development, it always implies "development".

The modern economic model seeks to measure development with the use of a Basic Unmet Needs indicator, a concept used by organizations such as the World Bank, the IMF, and the Ministries (Departments) of Economy of the countries of the so-called Third World, that, by using complex calculations that include materially-based categories such as housing, access to public services, transportation, level of formal education, and spending capacity (household appliances and sumptuary goods), among others.

But this indicator does not take into account other "basic unmet needs" that may be intangible but are no less important because of that. We may then talk about health, happiness, socially-minded production means, access to non-formal and informal education systems, the need for transcendence—and ultimately, the meaning of life (see Table 2).

It is precisely the indigenous peoples that remind us that life does not mean only consumption, financial well-being, and acquisition of material goods. Their cosmovision, their way of life in a framework of collective property and their direct access to other conscious levels that facilitate the feeling of transcendence are concepts that we should not forget when the time comes to negotiate or agree on the concept of development.

**Table 2.** Development Concept.

| The Concept of Development | |
|---|---|
| **Basic Unmet Needs** | **Intangible Needs** |
| Shelter | Health |
| Work | Happiness |
| Vehicle | Solidarity |
| Public Services | Meaning of Life |
| Education | Transcendence |
| Health Insurance | |
| Social Security | |

## Culture, Nature and Health

It is not easy, therefore, to establish an authentic intercultural dialogue in the search for common formulae for the conservation of biological and cultural diversity and bioprospecting. It requires, of course, that the ethnic groups understand the concepts and the deeper meanings of the language of the non-indigenous peoples. Equally as important is that the latter understand the concepts and deeper meanings of the language of the indigenous peoples. As a first approximation, and based on long work experience with indigenous groups in the Amazon piedmont, I posit that the analysis of the indigenous reality can be approached from the perspective of the triad of Culture-Nature-Health (Figure 1.)

In this context, culture refers to cosmovisions, production systems, type of social relationships, interpretation of everyday reality; nature refers to natural resources, classified by Westerners as the Plant, Animal, and Mineral Kingdoms, but for the indigenous peoples in a much more global way in the concept of Mother Earth; and health includes the concept of harmony among people-society-nature, social and emotional justice, and respect for or violation of the natural ethics.

Nevertheless, we should be wary of once again basing our research on the analysis of independent categories. What we propose here is the search for interrelationships among these three concepts. From the former standpoint, culture is studied by the social sciences, nature by the biological sciences, and health by the medical sciences. We are long overdue in elaborating scientific disciplines of interdisciplinary nature, understood not simply as the arithmetic sum of the results of each individual discipline, but as a more integrated group vision of the indigenous reality—and ultimately of reality itself.

We observe four intersecting regions among the three circles in Figure 1. It is precisely in those spaces where we can formulate new thought strategies and work towards environmental, social, and health projects. These are:

**2a**: Corresponds to the relationship health-nature. We can first mention the concept of nature's health or health of the ecosystems, to refer to the state of biological resources. Secondly, it also refers to the important role that the environment plays in human communities' health. Air and water quality, the availability of fertile soil to ensure food production, the accumulation of garbage and toxic waste, the contamination due to nuclear radiation, and other issues are factors that directly impact health levels. Not without cause do recent WHO documents arrive at the conclusion that "the planet is sick;" in advancing new health policies the documents affirm: "Our planet, our health."

Lastly, there is a close relationship between health and nature established through medicinal plants. The production of secondary metabolites in the Plant Kingdom with surprising and specific usefulness in the Animal Kingdom, and particularly in man, shows us the extraordinary coincidence of biological and chemical substances the natural world provides toward the solution of human health problems. It is the shamans and traditional indigenous doctors that can tell us more about this topic. Moreover, the medicinal plant category goes further than the biomedical criterion: stimulant and psychotropic plants are of special importance not only in the diagnosis, cure, and prevention of diseases, but also for land and cultural management of these ethnic groups.

**2b**: Corresponds to the relationship nature-culture. Even though the biological sciences also talk about culture to refer to animal behavior, a relationship already well known to the shamans, this category has to be examined in detail in the case of the relationship between nature and human culture. It is for this reason that the nascent field of cultur-

**Figure 1**. Culture, Nature and Health.

ally-conscious ecology begins to discover the paramount role that the environment and the availability of resources plays in the development of cultural, ethical, and strength in human societies.

It is surprising to examine the rituals of origin of many tribal peoples, which assign the genesis of their cultures to a plant that symbolizes, through its domestication, the beginnings of their societies, such as the Mayan, who consider themselves “sons of the corn”, or several Amazonian peoples who call themselves “sons of the manioc”, among other examples.

It is precisely ethnobiology, with its various branches - ethnobotany, ethnozoology, ethnoecology, etc. - the discipline that is now pursuing the interrelationship between nature and human culture.

**2c**: Corresponds to the relationship culture-health. This is the space that belongs to traditional medicine, understood as the medical system employed by indigenous or campesino communities for the management of health and disease. Nevertheless, we are still far from understanding the intrinsic workings of traditional medicines, and we in the western world almost always categorize their medicine as the product of ignorance, superstition, or fabrication. Nevertheless, traditional doctors regard as diseases not only the ailments of the mind or the body (as do psychiatry and modern medicine), but also problems such as work or conjugal difficulties, bad luck in hunting or fishing, or bad relationships with others.

Yet there is a common space between the three circles, in the center, that is designated with the number **1**. It is in this convergence space where the relationship health-nature-culture is complete and indissoluble. There is still no science in the framework of occidental scientific thought and its different disciplines that is able to approach such a level of integration. But we can affirm with certainty that the authentic shamanic systems that still survive are precisely the ones that have much to teach us about this integration of concepts.

We may choose to accept the role of apprentices and students of the indigenous elders and sages, and allow them to explain to us a reality that does not admit differences between culture, nature, and health as a starting point for building a new discipline that includes also our rational scientific legacy.

## Biological and Cultural Recovery

Since 1994, and with the support of the Amazon Conservation Team (ACT), we are advancing a biological and cultural recovery and conservation program in the Colombian Amazon in which we try to apply the aforementioned concepts regarding the link between culture, biodiversity, and health.

The Colombian Amazon Piedmont: The Amazonian jungle, the largest tropical rainforest on the planet, is surrounded by the great Amazon river and its tributaries that have their headwaters in the high snow-capped mountains in the Equatorial Andes and flow downwards until they reach the forest plains. For hundreds of years it was believed that this region started in the plains east of the Andes and that it had no relationship with the occidental slope of the great mountain range. We already know that the Amazon, both the river and the rainforest, start at the summit of the high Andean mountains, and that the slopes and the rivers are also the Amazon. Thus today we talk about the Amazon piedmont, an enormous hinge that establishes the continuity between the mountains and the plains, a staircase of earth that serves as a land bridge so that flora, fauna, and people form a single landscape.

For biologists, the piedmont constitutes the transition zone between the ecosystems of the lowlands and the ones of the high mountains, and for anthropologists, the piedmont forms the transition zone between the “almost wild” and “naked” cultures of the Amazon plains and the “almost civilized” and “dressed” indigenous groups of the Andean high plateaus.

For the experts, the present biogeographic configuration of the Amazon piedmont is the result of the formation of the Napo River, one of the 12 or 13 Pleistocene refuges in South America. The floristic and cultural evolution of this immense region occurred in parallel. And nature, in its enthusiasm for diversity, left as its unique legacy a group of plants unknown in any other place in the planet. Among them stands out an ordinary liana, known to botanists as *Banisteriopsis* spp., that nonetheless represents for the original inhabitant their sacred plant, named **yagé** or **ayahuasca** (Schultes & Raffauf 1990). All the culture, the way of life, and the natural knowledge of the various indigenous groups of the piedmont have as a starting point, center, and culmination, the ritual and sacred consumption of **yagé**. Because of this, anthropologists have named this region and its inhabitants the “culture of **yagé**,” regarded as one of the mostly purely preserved shamanic traditions in the world.

The shamanic practices of these peoples are based on the celebration of ritual ceremonies in which **yagé** is consumed, a plant that they consider to be a gift from God, and that, thanks to the trance that it generates, gives the opportunity to communicate with the supernatural world and manage the realities of their culture, as well as providing the opportunity to acquire great powers to heal. These practices include a special relationship with nature, in which they invoke the strength of their mythical animals such as jaguars, parrots, and snakes, and also achieve

knowledge on the use of medicinal, food, psychotropic, stimulant, timber, and craft plants.

The Amazon piedmont region has been greatly affected by the colonization processes, which brought on very serious environmental and cultural consequences. The indigenous peoples lost the major part of their territories, and have been affected by the severe deforestation that resulted in the loss of the majority of their medicinal plants and the consequent impoverishment of their culture and their traditional medical system. In addition, the shrinking of the area available for their traditional rotation production systems resulted in the decline of their self-subsistence capacity.

Of the eighty Colombian indigenous groups that survived the so-called Discovery of America, only five inhabit the Colombian Amazon piedmont. These are: a) Kamsá, inhabitants of the Sibundoy Valley, and possibly descendants from the quillacingas of Nariño; b) Siona, who live on the margins of the Putumayo River; c) Kofán, that reside along the margins of the Putumayo, San Miguel, and Guamuez Rivers; d) Inga, that live mostly in the Sibundoy Valley and in the area surrounding Mocoa, and e) Coreguaje, that live on the margins of the Orteguaza River. Integrated Strategy for the Biological and Cultural Conservation of the Amazon Piedmont.

We want to emphasize that any recovery and conservation strategy designed to be implemented in this region has to be based on the recovery of the shamanic tradition of those peoples, and obviously, on the protection of their sacred plant, **yagé**. To this point, the ideals of true intercultural dialogue have been met because all the strategies implemented to date have been planned by the shamans in the framework of their ritual sessions and with the overall objective of first recovering cultural traditions in order to then conserve biological diversity. In the same vein, the following are the processes that the Colombia Program of the Amazon Conservation Team has been following for the last 6 years, through financial support and the establishment of bridges with the appropriate institutions.

Life plans: Based on their constitutional fundamental rights, the indigenous peoples want to fully realize their five fundamental rights: Autonomy, Identity, Territory, Participation, and Development. As a result, they are forming the Associations of Cabildos, whose authorities are drawing the development plans that they prefer to call Life Plans. With the leadership of the Association of Cabildos Tandachiridu Inganokuna, for the last four years they have been developing programs on ethnoeducation, sustainable production, and primary healthcare.

Indigenous Territorial Strategy: With the participation of the Environment Ministry and the National Unit of Natural Parks, the peoples of the **yagé** culture are developing a Geographic, Biologic, and Cultural Atlas of the Amazon piedmont for the purpose of recovering their ancestral territories and creating a bio-cultural corridor, towards the establishment of a Land Management Plan. This includes expeditions through the rivers of their ancestral territories; biological inventories and documentation together with the Research Institute Alexander von Humboldt; and the elaboration of a basic cartography and cultural research and documentation project to determine the localization of their sacred areas and the zones with high endemic populations of medicinal and sacred plants.

Union of Shamans: The indigenous peoples of this region, because of colonization and of the loss of their territories, were left isolated from each other. Moreover, the shamans, who were prosecuted by both missionaries and the Government, chose to hide and became secluded.

Nonetheless, as a result of the support given to the strengthening of indigenous medicine, forty shamans from five different **yagé** culture ethnic groups got together in June 1999 to establish friendships and exchange knowledge. As a result, they formed the Union of **Yagé** Healers of the Colombian Amazon with the goal of the defense of their shamanic heritage (UMIYAC 1999). Since then, they have been conducting Health Brigades and Shaman's Apprentice Programs (Plotkin 1993), constructing ceremonial roundhouses and botanical gardens, and formulating a Code of Ethics of Indigenous Medicine.

Code of Ethics of Indigenous Medicine: Very early in the process, the shamans initiated the difficult task of developing a Code of Ethics of the indigenous medicine of the Amazon piedmont that they chose to call The Beliefs of the Elders (UMIYAC 2000). A pledge to respect life, a challenge to accept the dimension of the invisible world, basic rules for shaman's apprenticeships, and the demand for respect towards their sacred plant, their territories, and their culture, are some of the ideas at the center of this historic document. For the first time in history, a group of people, considered by many as primitive, speaks to us and challenges our way of understanding otherness, and becomes an enormous dual challenge: on one hand, for the indigenous peoples, the pledge they make when they state that they want to heal, purify, and elevate their legacy and their medicine. On the other hand, for us, who pride ourselves on being the heirs to modern rational culture, the challenge is to finally accept the need for a true dialog between cultures and between sciences.

The aforementioned document has been officially presented to the WHO, the World Organization of Intellectual Property, and the WTO, as well as to the authorities of the Colombian Ministries of Health and Environment and University representatives. Even though the words of the shamans invoke the tradition of **yagé** and of the Amazon piedmont, I believe that their testimony can serve as an example to other indigenous peoples, and symbolically invites scientists and academicians of the Western world to

initiate an authentic and respectful intercultural dialogue, just as Dr. Richard Evans Schultes recommended.

## Conclusions

Bioprospecting, justified by the need to find urgent solutions to health ailments in the modern world, is not only confronted with phytochemical, pharmacological, medical, and genetic resources problems. It is imperative that ethnobiology, as a scientific discipline that supports the search for active principles in nature, begin to contemplate new ethical considerations:

1. The need to safeguard the cultural and biological diversity of the planet.
2. The respect for the heritage and collective property rights of the indigenous peoples.
3. The willingness to learn from the indigenous knowledge systems new approaches for the construction of a new culture of life and health.
4. The possibility of considering the concepts of biodiversity and development in a more integrated fashion which contemplates culture, nature, and health.

In any case, concepts such as conservation, biodiversity, and bioprospecting have to be approached more cautiously, since the possibility of constructing bridges with traditional knowledge is contingent on reaching an agreement on common strategies for the conservation of biological and cultural diversity on the planet.

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